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AIP report
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ENROLLMENTS AND DEGREES

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An assessment of the future supply of physicists and astronomers can be based on data from the educational pipeline which ranges from freshman-level college enrollments to the number of doctorates conferred by graduate schools. The Survey of Enrollments and Degrees gathers these data annually and in considerable detail. Physics enrollments and degrees have been monitored by means of this survey since 1960; in the mid-1970s the survey was expanded to include astronomy data.

Shortly after the beginning of each academic year all degree-granting physics and astronomy departments are asked to report the number of physics and astronomy degrees granted during the previous academic year, as well as the current year's undergraduate and graduate enrollments. This summary report of last year's survey results focuses on the degree recipients from the class of 1986 and analyzes the enrollments for 1986–87. Ten-year trends are presented to illustrate recent changes. The major portion of this report deals with analyses of physics students; astronomy data are presented on the last page.

Table I classifies institutions according to the highest physics degree granted and presents the yearly changes in those numbers since 1982. Although the number of doctorate-granting institutions remained at 168, four universities reported changes in their graduate programs for the year 1986–87. Alabama A&M University and Michigan Technological University expanded their master's degree programs to doctoral programs, while the University of St. Louis and Southern Methodist University (in Texas) discontinued their graduate programs entirely and retain only their physics bachelor's degree programs. Interchanges between master's and bachelor's degree programs occur more frequently. The existing bachelor's degree programs may be expanded to include a master's degree, or discontinued bachelor's degree programs are reinstated. The latter accounts for the recent increase in the number of bachelor's institutions shown in **Table I**.

Table I. Institutions by highest physics degree offered, 1982–1987.

Academic year	Doctoral granting*	Master's granting	Bachelor's granting
1982–83	164	94	488
1983–84	165	92	490
1984–85	168	90	487
1985–86	168	91	485
1986–87	168	90	496

*Four of these institutions have two physics doctorate-granting departments. They are Stanford U., U. of CA-Davis, Harvard U. and Cornell U.

The physics degree production presented in **Figure I** displays a variety of trends. Four trends represent the three levels at which physics degrees are granted because we distinguish

Figure I. Physics degrees awarded by academic year, 1975–1986.

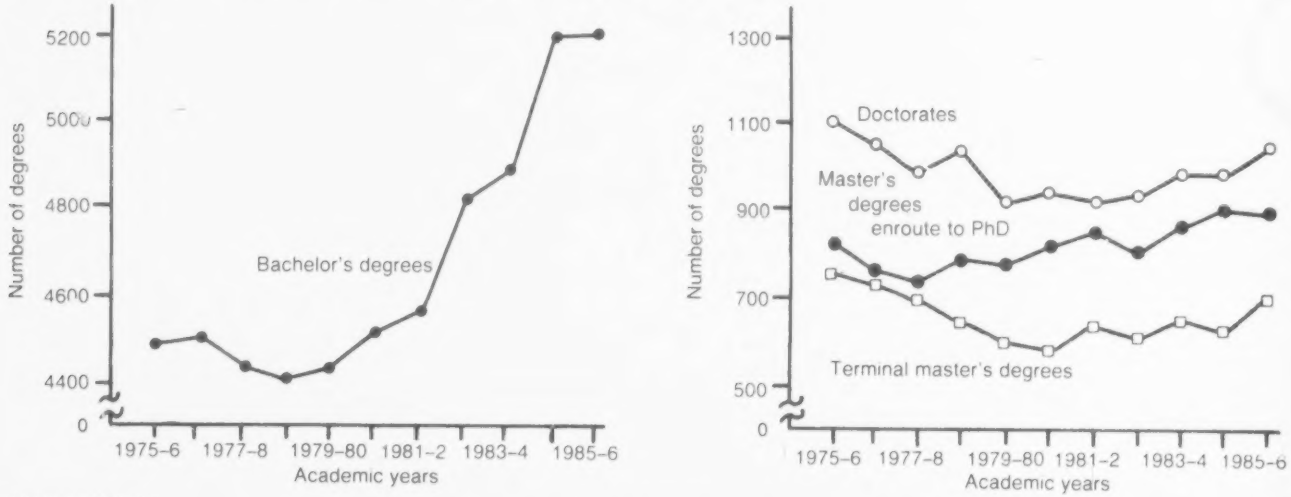

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Table II. Physics enrollments and degrees awarded by academic year, 1975–1987.

Academic year	Number of physics degrees granted (July 1 to June 30)			Undergraduate physics major enrollments		Graduate physics student enrollments*	
	Bachelor's	Master's	Doctor's	Juniors	Seniors	Total	1st year
1975–76	4487	1570	1111	5888	4922†	10 372	2646
1976–77	4517	1469	1051	5711	4930†	9 991	2624
1977–78	4457	1422	971	5820	4975††	9 835	2499
1978–79	4416	1428	1033	5835	4964	9 813	2458
1979–80	4440	1370	912	5696	4942	9 647	2439
1980–81	4513	1387	927	5905	5091	9 934	2564
1981–82	4558	1476	912	6386	5372	10 173	2637
1982–83	4795	1426	921	6299	5580	10 429	2630
1983–84	4878	1521	971	6303	5658	10 922	2855
1984–85	5188	1518	972	6601	6009	11 337	2863
1985–86	5214	1589	1051	6689	6092	12 011	2981
1986–87				6592	6119	12 616	3162

*Includes part-time students.
†This total has been adjusted by 500 students who were seniors for more than one year.
††This total has been adjusted by 300 students who were seniors for more than one year.

Table III. Undergraduate and graduate enrollments and degrees by institution type, 1975–1987.

Academic year	Number of physics degrees granted (July 1 to June 30)			Undergraduate physics major enrollments		Graduate physics student enrollments*	
	Bachelor's	Master's	Doctor's	Juniors	Seniors	Total	1st year
Doctorate granting institutions							
1975–76	2182	1249	1111	2983	2505	9 241	2163
1976–77	2184	1186	1051	2862	2502	8 867	2182
1977–78	2218	1164	971	2851	2590	8 852	2138
1978–79	2158	1183	1033	2937	2579	8 864	2107
1979–80	2142	1151	912	2696	2491	8 744	2072
1980–81	2123	1161	927	2765	2568	9 062	2223
1981–82	2179	1281	912	2996	2671	9 273	2275
1982–83	2192	1210	921	2962	2645	9 524	2288
1983–84	2195	1319	971	2955	2824	10 006	2495
1984–85	2460	1286	972	3059	3105	10 357	2443
1985–86	2377	1358	1051	3120	2961	10 937	2574
1986–87				3132	3148	11 389	2667
Master's granting institutions							
1975–76	604	321		916	811	1131	483
1976–77	658	283		840	761	1078	442
1977–78	590	258		832	752	983	361
1978–79	541	245		795	694	949	351
1979–80	585	219		705	650	903	367
1980–81	589	226		868	655	872	341
1981–82	532	195		917	734	900	362
1982–83	554	216		877	752	905	342
1983–84	610	202		830	722	916	360
1984–85	658	232		974	781	980	420
1985–86	632	231		1014	865	1074	407
1986–87				913	791	1227	495
Bachelor's granting institutions							
1975–76	1701			1989	1606		
1976–77	1675			2009	1667		
1977–78	1649			2137	1633		
1978–79	1717			2103	1691		
1979–80	1713			2295	1801		
1980–81	1801			2272	1868		
1981–82	1847			2473	1967		
1982–83	2049			2460	2183		
1983–84	2073			2518	2112		
1984–85	2070			2568	2123		
1985–86	2205			2555	2266		
1986–87				2547	2180		

*Includes part-time students.

Table IV. Introductory physics enrollments, 1986–87.

Enrollment in introductory physics courses designed for:	Institution type: Bachelor's granting N	%	Master's granting N	%	Doctorate granting N	%	Total N	%
Engineering majors	20 900	30.0	13 250	33.0	73 650	44.6	107 800	39.2
Physical science majors	18 700	26.8	9 200	22.9	30 950	18.7	58 850	21.4
Biology, health-related majors	18 450	26.5	9 400	23.4	38 700	23.4	66 550	24.2
Other	11 700	16.8	8 300	20.7	21 800	13.2	41 800	15.2
Total introductory enrollment N	69 750		40 150		165 100		275 000	
%		25.4		14.6		60.0		100%

between terminal master's degrees and those granted enroute to a higher physics degree. Doctorates and terminal master's degrees clearly indicate increases that had been anticipated for some time. On the other hand, bachelor's and master's degrees enroute to higher physics degrees appear to have leveled off temporarily.

The data on which **Figure I** is based are presented in **Table II** together with undergraduate and graduate enrollment trends. Thus since 1975–76 both juniors and seniors recorded increases ; however, the seniors show a 24% increase whereas juniors increased only 11% over the same periods which reflect the lower attrition rates of the 1980s. Graduate enrollments declined until the late 1970s when they began a rapid increase, the details of which will be discussed in connection with **Tables VI** and **VII**.

A closer examination of the enrollment and degree data from **Table II** is possible when we divide the institutions into the three types by highest physics degree granted and thereby create **Table III**. Thus the leveling indicated by the most recent number of bachelor's degrees conferred emerges as an increase in degrees granted by the four-year colleges, and corresponding small decreases at the master's and doctoral institutions. Similarly, increases in master's degrees between the classes of 1985 and 1986 were reported primarily by the PhD-granting institutions. Master's institutions, on the other hand, shared in the increase in graduate enrollments.

Introductory physics enrollment

In order for the average college graduate to understand something of the world of science, many colleges and universities include an introductory physics course among their requirements for a bachelor's degree. Moreover, there are students whose intellectual curiosity motivates them to enroll in an introductory physics course. Potential physics majors at the freshman level number fewer than 9,000, but when the afore-mentioned groups are added together, the collective introductory enrollment for all physics-degree-granting institutions comes close to 300,000. The larger institutions offer several introductory courses each term and design them for specific groups of majors. Small four-year colleges, on the other hand, may offer only one freshman-sophomore level course, and perhaps not even teach it each term. **Table IV** classifies introductory courses by design for three categories of majors. The fourth category "Other" includes not only other potential majors, but also students who have not yet declared their majors in one of the first three categories.

The introductory enrollment by type of institution has changed little from previous years. Master's institutions continue to have the highest proportion of undeclared majors at the freshman-sophomore level, which accounts for the fact that one-fifth of their introductory physics students fall into the category labeled "other" in **Table IV**.

Undergraduate physics majors

At most institutions the required course work for a physics bachelor's degree extends over a four-year period; hence potential physics students are very likely to declare their majors during their freshman year. A result of this pattern is that physics department chairpersons can estimate the numbers of freshmen and sophomores who will formally declare their physics majors as they become juniors. By using the estimated totals for freshmen and sophomores together with the actual reports of juniors and seniors over a four-year period,

Figure II. Actual and projected number of undergraduate physics majors.

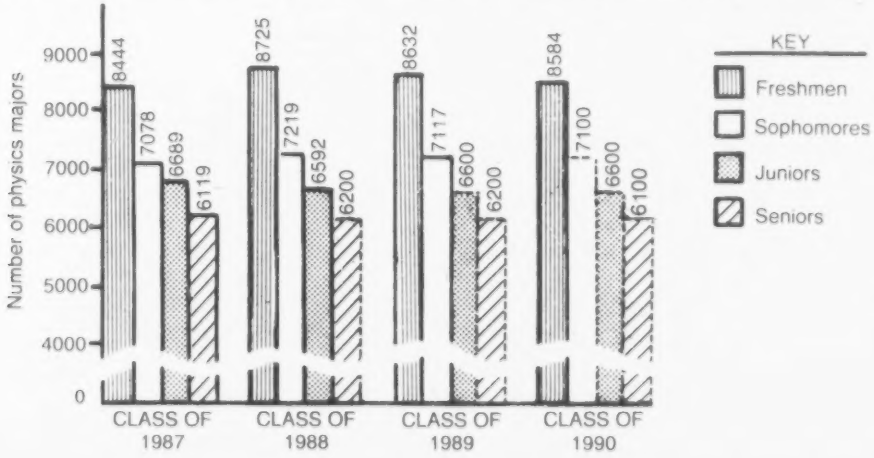


Table V. Attrition of undergraduate physics majors by type of institution, 1976–77 to 1985–86.

	Doctorate granting institution		Master's granting institution		Bachelor's granting institution	
Graduating class	No. of freshman	% reaching sr. year	No. of freshman	% reaching sr. year	No. of freshman	% reaching sr. year
1980	3450	74%	1110	60%	3200	56%
1981	3520	73	1070	63	3310	57
1982	3590	73	1140	63	3410	59
1983	3770	72	1160	63	3510	60
1984	3890	74	1250	60	3550	60
1985	3940	75	1160	68	3560	60
1986	3930	78	1170	69	3570	61

we can determine the net attrition between the freshman and senior years for each graduating class. **Figure II** follows the freshman physics majors of September 1983 through four years of undergraduate study to become the graduating class of 1987. Last September's estimate of freshman physics majors was 8584, and they are projected to yield 6100 seniors who will become the class of 1990.

Although the overall attrition of physics majors indicated by four consecutive graduating classes in **Figure II** is relatively constant, the success with which the small and large institutions compete for and retain physics majors through four undergraduate years varies significantly for the three types of institutions. **Table V** analyzes the attrition rates by comparing the numbers of freshmen who are viewed as potential physics majors with the proportion that reaches senior status three years later. For example, by dividing the 1979–80 seniors by the corresponding number of freshmen (1976–77) for each type of institution, we find that at PhD-granting schools 74% of the freshmen reached senior status, while only 60% of a similar group at the master's institutions, and only 56% of the freshmen at the bachelor's institutions did so. But when one considers that the four-year institutions enroll collectively almost as many freshman physics majors as the PhD-granting schools, the latter group appears far more successful at limiting attrition than the bachelor's institutions. It should be noted here that a number of four-year institutions have cooperative programs with large universities in the area to which their junior-level physics majors can transfer as they complete their bachelor's degrees. However, most of those transfer students are counted as "seniors on leave" by the four-year institutions.

A more detailed distribution of the four levels of undergraduate physics majors is presented in **Table VI**, which shows these enrollments for nine geographic regions as well as by type of degree-granting institution. The last column of this table, "Fifth-year undergraduates," consists of 928 students who need an additional summer or term to complete their degree requirements. Such delays can be attributed to any of a number of reasons the most common of which are completing the senior year on a part-time basis or having transferred from a two-year college. Between 10% and 12% of the 1986 bachelors fell into each of these two categories. Thus by separating those 928 seniors from the others, physics majors at each level are counted only once. The lower portion of **Table VI** presents the kinds of information, undergraduate enrollments by type of institution, from which the trend data of **Table V** were calculated.

Table VI. Undergraduate physics majors by geographic region and type of institution, 1986–87.

Geographic region*	Estimated** no. of freshmen	Estimated** no. of sophomores	Number of juniors	Number of seniors	Fifth-year undergraduates
New England	620	581	577	499	42
Mid Atlantic	1532	1312	1091	1008	95
E. N. Central	1361	1102	1005	921	121
W. N. Central	717	605	552	498	73
S. Atlantic	1377	1119	906	759	93
E. S. Central	401	301	272	278	34
W. S. Central	680	574	547	462	90
Mountain	518	497	417	536	96
Pacific	1378	1026	1225	1158	284
Total	8584	7117	6592	6119	928
Doctorate granting inst.	3776	3238	3132	3148	481
Master's granting inst.	1054	871	913	791	183
Bachelor's granting inst.	3754	3008	2547	2180	264

** New England–CT, ME, MA, NH, RI, VT; Middle Atlantic–NJ, NY, PA; East North Central–IL, IN, MI, OH, WI; West North Central–IA, KS, MN, MO, NE, ND, SD; South Atlantic–DE, DC, FL, GA, MD, NC, SC, VA, WV; East South Central–Al, KY, MS, TN; West South-Central– AR, LA, OK, TX; Mountain–AZ, CO, ID, MT, NV, NM, UT, WY; Pacific–AK, CA, HI, OR, WA.*

***Estima'es of potential physics majors are made by the physics department chairpersons.*

Graduate enrollment

When the total graduate physics enrollment reversed its ten-year decline in 1980 to resume an upward trend, it was the foreign students who caused this change in trend. At the undergraduate level foreign students comprise only a steady 6% because the great majority of them enter the U.S. with the equivalent of bachelor's degrees and the intention to complete doctorates. **Table VII** focuses on the first-year graduate physics students and the ratios of U.S. to foreign citizens among them. Ten years ago one out of four students was foreign; in 1986-87 two out of five students are foreign. The separate trends indicated by these two groups of entering graduate students differ greatly. U.S. students declined from 3,000 in the early 1970's to 1,600 in 1982 before resuming a very gradual upward trend. Foreign students, on the other hand, increased on a year by year basis from 1980 on.

Table VII does not distinguish between the two types of graduate institutions where physics students are enrolled. Approximately 10% of all graduate physics students are enrolled at the master's-granting institutions, and that proportion has hardly changed during the past decade as indicated in **Table VIII**. However, the composition of the student body at these institutions did undergo several changes that are worth noting. For example, ten years ago 6% of all foreign graduate physics students enrolled at master's institutions. By 1986-87 that fraction rose to 8%, and, though small, this increase in turn appeared to influence the distribution of full-time and part-time students. Traditionally, the master's-granting institutions served industrial companies in their geographic areas by providing graduate programs to their employees on a part-time basis. As foreign students began to comprise an increasing proportion of that students body (from 13% to almost 30%) the proportion of part-time students decreased by eight percentage-points (from 44% to 37%) at the master's-granting institutions. The proportion of part-time students at PhD-granting institutions remained less than 8% over the past decade.

Since very few foreign students receive support from their native countries, they are obliged to compete with U.S. students for the available teaching assistantships at the institutions that enroll them. **Table IX** indicates that approximately half of the teaching assistantships, at either type

Table VII. Trend in entering U.S. and foreign graduate physics students, 1977–1987.

Academic year	No. of first-year graduate students U.S.	Foreign	Total	% foreign students of total
1977–78	1851	648	2499	26.0
1978–79	1840	618	2458	25.2
1979–80	1700	739	2439	30.3
1980–81	1720	844	2564	32.9
1981–82	1654	983	2637	37.3
1982–83	1576	1054	2630	40.1
1983–84	1763	1092	2855	38.2
1984–85	1747	1116	2863	39.0
1985–86	1721	1260	2981	42.3
1986–87	1799	1363	3162	43.1

Table VIII. Full-time, part-time and foreign graduate physics enrollment by type of institution, 1977–1987.

Academic year	Graduate students at doctorate granting institution: Full-time	Part-time	Foreign	% foreign of total	Total	Graduate students at master's granting institution: Full-time	Part-time	Foreign	% foreign of total	Total
1977–78	8 174	678	2 061	23.3	8 852	546	437	128	13.0	983
1978–79	8 185	679	2 175	24.5	8 864	468	481	157	16.5	949
1979–80	8 059	685	2 390	27.3	8 744	550	353	146	16.2	903
1980–81	8 302	760	2 540	28.0	9 062	484	388	163	18.7	872
1981–82	8 555	718	2 894	31.2	9 273	543	357	213	23.7	900
1982–83	8 712	812	3 193	33.5	9 524	566	339	221	24.4	905
1983–84	9 285	721	3 433	34.3	10 006	569	347	254	27.7	916
1984–85	9 647	710	3 811	36.8	10 357	604	376	293	29.9	980
1985–86	10 119	818	4 259	38.9	10 937	620	454	306	28.5	1074
1986–87	10 583	851	4 519	39.7	11 389	772	455	397	32.4	1227

Table IX. Regional distribution of U.S. and foreign teaching assistants by type of institution, 1986–87.

Geographic region*		Doctorate-granting institutions: Total no. of TA's	Total no. of foreign TA's	Master's-granting institutions: Total no. of TA's	Total no. of foreign TA's
New England		501	244	29	21
Mid Atlantic		759	454	16	4
E. N. Central		727	338	161	83
W. N. Central		277	144	63	30
S. Atlantic		540	268	57	20
E. S. Central		168	99	40	24
W. S. Central		408	255	58	33
Mountain		327	165	11	6
Pacific		576	233	72	21
Total	N	4283	2200	507	242
	%		51.4%		47.7%

**See Table VI for explanation of geographic region.*

Table X. Unfilled teaching assistantships for first-year graduate physics students, September 1986.

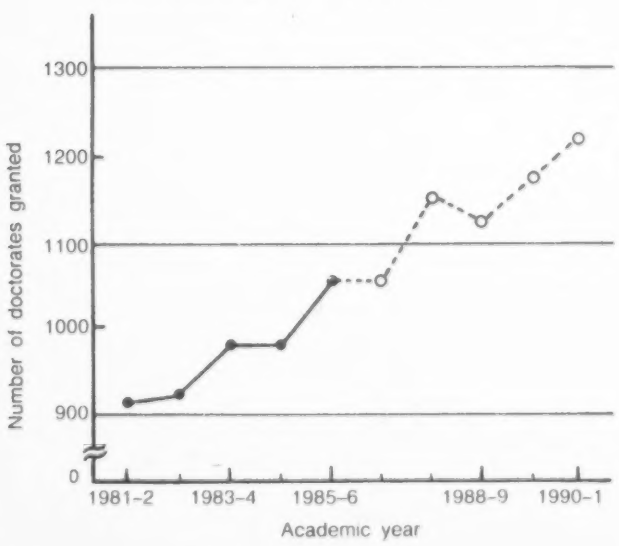
Geographic region*	Doctorate granting: departments with unfilled assistantships 0	1–2	3–5	≥6	No. of unfilled ass'tships	No. of 1st yr. grad. students	Master's granting: departments with unfilled assistantships 0	1–2	3–5	No. of unfilled ass'tships	No. of 1st yr. grad. students
New England	18	1	1	0	5	294	3	0	1	3	42
Mid Atlantic	26	3	0	0	4	432	5	2	0	3	20
E. N. Central	20	2	0	0	3	430	19	3	0	4	132
W. N. Central	10	2	0	0	2	148	11	2	0	2	51
S. Atlantic	24	1	0	1	10	296	11	3	0	4	65
E. S. Central	8	2	0	0	3	109	6	1	0	2	36
W. S. Central	13	1	0	1	11	218	8	2	1	9	52
Mountain	14	1	1	0	4	227	2	1	0	1	10
Pacific	22	0	0	0	0	513	6	1	2	7	87
Total	155	13	2	2	42	2667	71	15	4	35	495

**See Table VI for explanation of geographic region.*

of graduate physics department, are held by foreign students. However, geographically the teaching assistantships are distributed unevenly. For example PhD-granting institutions in the Mid-Atlantic region reported the largest number of teaching assistants, 60% of whom were foreign; the Pacific region, on the other hand, appears to be that in which a foreign student is least likely to be offered an assistantship.

One aspect of financial support that potential graduate physics students may not be aware of is that each year some teaching assistantships for first-year students remain unfilled. **Table X** indicates on a geographic basis where the unfilled assistantships are and how many exist at doctoral or master's-granting departments. In a comparison with earlier years we find that the South-West-Central region replaces the South-Atlantic region as the one with the largest number of unfilled assistantships. Furthermore, we see that one entire region of PhD-granting institutions (the Pacific region) had all assistantships filled. We have not seen a previous example of completely filled assistantship positions in any region since we started reporting on these data in 1981.

Figure III. Actual and projected number of physics doctorates granted, 1981–1991.



Degrees granted

The median number of years of graduate study required to complete a physics doctorate remains between five and six years and has a range from three to more than ten years. The high correlation between the first-year graduate students at PhD-granting institutions and the number of doctorates granted five years later is the basis for our projection presented in **Figure III**. In recent years between 44% and 47% of a given year's entering graduate students complete their doctorates five years later. The rapid increase in foreign graduate students that began in 1979 is expected to reduce the number of years of graduate study as well as the attrition rate. The number of doctorates conferred on the class of 1986 represented an 8% increase over the previous year. If we project that 46% of the corresponding first-year graduate students complete their doctorates, close to 6,000 physics PhD's may be conferred between now and 1991.

Figure I and **Table I** refer to the four types of physics degrees granted by three types of institutions; **Table XI** presents the degree data for 1985-86 in considerably greater detail. For example, each year the smallest group of graduates is the one receiving master's degrees enroute to higher physics degrees from master's-granting institutions. The class of 1986 included 58 such graduates who were obliged to transfer to doctoral institutions to continue their studies.

Terminal master's degrees are primarily granted by doctoral institutions rather than by master's institutions as shown in **Table XI**, which indicates a 3:1 ratio for that degree production.

In connection with the recent increase in physics doctorates granted, we conclude from the geographic distribution of **Table XI** that the Northeastern universities recorded major increases while the PhD production at institutions in the Southeast declined by 27%.

Closely tied to the data we collect and analyze on foreign student enrollment in physics programs are our data on minority groups, because a majority of these individuals are foreign citizens. We define minority groups as those who

Table XI. Physics degrees by type of institution and geographic region, 1985–86.**

Geographic region*	Bachelor's degrees			Master's degrees		Terminal master's degrees		Doctorates
	Institution type			Institution type		Institution type		Institution type
	I	II	III	II	III	II	III	III
New England	149	20	348	9	113	9	65	156
Mid. Atlantic	488	23	438	0	181	12	65	207
E. N. Central	319	136	298	24	163	42	119	186
W. N. Central	217	77	122	4	32	18	32	50
S. Atlantic	298	87	294	9	66	19	54	96
E. S. Central	108	78	58	2	29	16	24	10
W. S. Central	156	75	126	3	51	27	28	86
Mountain	90	13	201	0	46	4	38	41
Pacific	380	123	492	7	146	26	106	219
Subtotal	2205	632	2377	58	827	173	531	1051
Subtotal				885		704		
Total		5214			1589			1051

See Table VI for explanation of geographic region.
***Institution type indicates the highest physics degree offered; type I = bachelor's degree, type II = master's degree, type III = doctorate.*

have a small but noted representation among the physics degree recipients, a definition that clearly applies to women physics graduates. Thus **Table XII** focuses on the most recent academic year, 1985-86 and lists specific minority groups by sex, but irrespective of citizenship. The sources of this information are (1) a report from physics department chairpersons and (2) identification with minority groups by individual graduates. The second source forms part of two student surveys* conducted annually by the American Institute of Physics. The response rates from these two surveys differ significantly; only between 55% and 65% of the students return their questionnaires, whereas over 90% of the physics departments complete theirs (although in some cases they indicate that information on minorities is not available). Therefore, calling attention, in last year's cover letter to chairpersons,to the importance of reporting the number of minority degree recipients and providing an outline on the form, improved the responses to that question considerably. The substantial increase in women physics doctorate recipients (from 74 to 93 in one year) should primarily be attributed to the rise in foreign graduates.

*"Survey of Physics and Astronomy Bachelor's Degree Recipients", AIP Pub No. R-211.18.
"Graduate Student Survey", AIP Pub No. R-207.19.

Table XII. Number of physics degrees granted by sex and minority group* status, 1985–86.

Type of degrees	Sex	Total no. of degrees	Black	Native American Indian	Hispanic	Oriental	Asian Indian	Arab
Bachelor's	Men	4494	162	15	50	117	37	37
	Women	720	29	3	8	29	13	1
	Total	5214	191	18	58	146	50	38
Master's enroute	Men	762	6	3	11	146	46	22
	Women	108	7	0	0	29	12	6
	Total	870	13	3	11	175	58	28
Terminal master's	Men	600	23	4	12	59	27	19
	Women	113	2	1	0	14	13	3
	Total	713	25	5	12	73	40	22
Doctorate	Men	958	7	2	27	108	47	24
	Women	93	2	0	0	10	15	7
	Total	1051	9	2	27	118	62	31

Minorities in AIP surveys are defined as groups with a low representation in the physics community, but ones whose participation has aroused considerable interest.

ASTRONOMY

Table XIII. Trend in astronomy enrollments and degrees, 1977–1987.

Academic year	No. of astronomy degrees granted (July 1 to June 30)				Undergraduate astronomy major enrollments		Graduate astronomy enrollments	
	Bachelor's	Master's enroute	Terminal master's	Doctor's	Juniors	Seniors	Total	1st year
1977–78	177	64	31	93	295	270	803	171
1978–79	165	42	42	90	270	249	710	145
1979–80	165	27	27	106	262	242	698	154
1980–81	156	34	24	82	275	238	686	164
1981–82	181	54	15	70	252	224	647	142
1982–83	138	61	22	81	274	232	670	178
1983–84	137	51	22	74	242	217	688	154
1984–85	145	56	16	66	239	212	716	151
1985–86	169	61	24	86	232	252	711	170
1986–87					268	255	755	173

The total number of astronomy-degree-granting departments remains at 67, all of which contributed their enrollment and degree data to this annual survey. Included in this total are 39 separate astronomy departments and 28 that are combined with physics departments. The ten-year trend data presented in **Table XIII** show increases in each of the four groups of astronomy degrees conferred in 1985-86. However, in an attempt to interpret the fluctuations that occur in the trend data we need to refer to the combined physics and astronomy departments where difficulties of definition arise when astronomy students are granted physics degrees.

By focusing on the most recent enrollments and degrees, we divided the 67 institutions on the basis of highest astronomy degree granted and present **Table XIV**, which shows the disproportionate contributions the 44 PhD-granting departments make. Unlike physics, the graduate astronomy departments appear to have a large pool of applicants from which to select their graduate students and only one in eight is offered an acceptance into a graduate astronomy program. On the other hand, the major contributors to the enrollment in introductory astronomy courses are the physics departments which enroll over 60% of those students.

Table XIV. Astronomy* enrollments 1986–87 and degrees 1985–86 by type of institution.

		Bachelor's granting	Master's granting	Doctorate granting	Total
Astronomy departments	Combined	14	1	13	28
	Separate	6	2	31	39
	Total	20	3	44	67
Astronomy degrees	Bachelor's	32	14	123	169
	Master's enroute	–	3	58	61
	Terminal master's	–	4	20	24
	Doctor's	–	–	86	86
Astronomy enrollments	Introductory enrollments in astronomy dept's.	4090	1155	33 835	39 080
	Introductory astronomy enrollments in physics depts.	–	–	–	63 230
	Total introductory enrollments	–	–	–	102 310
	Junior astronomy majors	55	15	198	268
	Senior astronomy majors	48	10	197	255
	No. of applicants to graduate programs	–	29	1 581	1 610
	No. of acceptances to graduate programs	–	11	209	220
	First-year graduate students	–	11	162	173
	Total graduate enrollment	–	29	726	755

**This survey includes only degree-granting astronomy departments.*

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AIP report
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DATA ON PHYSICS ENROLLMENTS AND DEGREES
a SUPPLEMENT

by Susanne D. Ellis

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SUPPLEMENT

The detailed data from the annual survey of Enrollments and Degrees are presented in this supplement. The 1985–86 physics degrees and the 1986–87 physics enrollments are listed for each of the 754 physics degree granting colleges and universities in the United States. Institutions are listed alphabetically by state. The data shown for each institution consist of undergraduate physics majors, full-time, and part-time graduate students, first-year graduate students included in that total, and physics degrees granted at all levels. All freshman and sophomore enrollments are estimated by the department chairpersons. Numbers shown in brackets are estimates based on data supplied by that institution in an earlier year.

- • Institution grants master's degree as its highest physics degree. (N=90)
- •• Institution grants doctorate as its highest physics degree. (N=168)
- 1 No undergraduate degree program in physics.

MEMBER SOCIETIES
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Institution	PHYSICS ENROLLMENTS 1986 - 87						PHYSICS DEGREES 1985 - 86			
	Undergraduate physics majors				Graduate students f-time & p-time					
	Fresh-men	Sopho-mores	Jr's	Sr's	Total	1st yr.	Bach.	MS	TMS	PhD
ALABAMA										
**AL A & M U.	7	7	5	10	35	8	2	2	3	0
AL State U.	3	1	2	3			0			
**AL-U.of Birmingham	11	4	2	5	21	9	2	0	4	0
**AL-U.of Huntsville	(5)	(5)	(4)	(6)	100	35	5	5	3	1
**AL-U.of Tuscaloosa	10	4	3	8	21	4	3	3	-	0
**Auburn U.	11	10	16	35	41	9	4	8	0	1
Birmingham Southern Col.	0	2	1	2			2			
Jacksonville State U.	1	1	2	0			0			
North AL-U.of	2	2	3	4			4			
Samford U.	6	4	1	0			1			
South AL-U.of	7	2	4	2			2			
Stillman Col.	3	4	6	2			1			
Talladega Col.	5	2	2	6			15			
Tuskegee U.	3	7	6	3			3			
ALASKA										
**AK-U.of Fairbanks	7	2	6	11	28	9	0	1	0	3
ARIZONA										
**AZ State U.	16	19	21	25	80	12	9	0	2	4
**AZ-U.of Tucson	25	27	36	35	120	31	21	11	3	5
Northern AZ U.	(5)	(5)	(5)	10			(8)			
ARKANSAS										
AR State U.	2	3	5	1			1			
**AR-U.of Fayetteville	13	6	6	4	39	10	6	0	1	1
AR-U.of Little Rock	7	6	3	2			5			
AR-U.of Monticello	1	0	6	0			2			
AR-U.of Pine Bluff	0	1	0	1			1			
Central AR-U.of	6	2	3	6			4			
Harding U.	2	2	3	1			2			
Henderson State U.	5	4	4	2			2			
Hendrix Col.	25	15	8	7			5			
Ouachita Baptist U.	3	3	2	2			2			
Southern AR U.	6	7	2	2			2			
CALIFORNIA										
**CA Institute of Tech.	40	41	45	40	135	28	38	13	0	15
CA Poly.State U. San L.O.	23	18	21	24			14			
CA State Col. Bakersfield	(5)	(3)	(4)	(4)			(3)			
CA State Col. Stanislaus	4	5	7	4			3			
CA State Poly.U. Pomona	54	27	33	30			14			
*CA State U. Chico	9	5	7	9	3	1	4	0	0	

Institution	PHYSICS ENROLLMENTS 1986 - 87						PHYSICS DEGREES 1985 - 86			
	Undergraduate physics majors				Graduate students f-time & p-time					
	Fresh-men	Sopho-mores	Jr's	Sr's	Total	1st yr.	Bach.	MS	TMS	PhD
CALIFORNIA (cont'd)										
CA State U. Dom. Hills	8	7	6	1			2			
*CA State U. Fresno	11	7	7	11	9	2	7	0	2	
CA State U. Fullerton	15	18	14	20			25			
CA State U. Hayward	12	10	13	6			8			
*CA State U. Long Beach	20	20	30	10	37	18	18	1	5	
*CA State U. Los Angeles	16	5	16	1	33	17	7	0	4	
*CA State U. Northridge	31	24	58	46	30	10	20	0	5	
CA State U. Sacramento	12	5	14	23			8			
CA State U. San Bern.	(7)	(7)	(6)	(5)			(4)			
**CA U.of Berkeley	90	90	68	117	265	46	107	9	0	42
**CA U.of Davis (Physics)	132	77	86	39	60	12	31	3	1	5
1**CA U.of Davis (Applied)	-	-	-	-	70	14	-	8	1	7
**CA U.of Irvine	76	60	64	60	75	21	37	2	1	10
**CA U.of Los Angeles	50	10	71	31	195	44	55	16	7	16
**CA U.of Riverside	14	12	28	18	64	16	13	12	0	5
**CA U.of San Diego	90	45	64	40	128	40	29	12	5	11
**CA U.of Santa Barbara	62	32	50	64	96	19	30	3	10	9
**CA U.of Santa Cruz	50	45	40	45	25	5	15	2	-	3
Claremont McKenna, Pitzer & Scripps Cols.	(2)	(2)	(0)	(1)			(1)			
Harvey Mudd Col.	25	30	25	21			26			
Humboldt State U.	6	7	9	20			20			
La Verne U.of	1	1	1	0			0			
Loma Linda U.	3	3	3	3			2			
Loyola Marymount U.	5	2	2	3			4			
1**Naval Postgraduate School	-	-	-	-	100	45	-	-	40	2
Occidental Col.	25	20	18	12			10			
Pacific Union Col.	10	4	3	2			3			
*Pacific U.of the	3	0	1	2	1	0	5	0	0	
Point Loma Nazarene Col.	13	9	4	3			2			
Pomona Col.	20	15	4	13			5			
Redlands U.of	5	3	2	1			2			
*San Diego State U.	15	20	55	40	32	13	27	2	5	
San Diego U.of	2	2	2	3			0			
*San Francisco State U.	20	25	16	11	34	11	12	4	2	
San Francisco U.of	7	5	8	6			6			
*San Jose State U.	41	24	68	55	46	15	17	0	3	
Santa Clara U.	7	12	11	13			14			
Sonoma State U.	10	11	20	23			17			
**Southern CA U.of	20	10	7	2	55	19	4	0	1	4
**Stanford U. (Physics)	15	12	22	20	146	36	25	5	-	32
1**Stanford U. (Applied)	-	-	-	-	138	33	-	7	6	16
Westmont Col.	18	12	7	4			6			
Whittier Col.	2	1	0	0			0			